**Experimental Design**

**Multiple Choice**

*Identify the letter of the choice that best completes the statement or answers the question.*

**PROCESS STANDARD 8.3.6: RECOGNIZE POTENTIAL HAZARDS & PRACTICE SAFETY PROCEDURES (LAB SAFETY)**

\_\_C\_\_ 1. The most important lab safety rule is

|  |  |
| --- | --- |
| A | design and conduct your own experiments without asking your teacher. |
| B | always wear safety goggles. |
| C | always follow your teacher’s instructions and textbook directions exactly. |

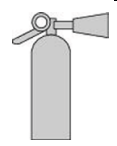
\_\_B\_\_ 2. What is the first thing you should do if an accident occurs?

|  |  |
| --- | --- |
| A | Find the emergency equipment. |
| B | Notify your teacher. |
| C | Go to the nearest hospital. |

\_\_C\_\_ 3. Which treatment should be first when acid is spilled on the skin?

|  |  |
| --- | --- |
| A | apply burn ointment |
| B | cool the skin with ice |
| C | rinse the skin with water |

\_\_B\_\_ 4. In which situation should this safety equipment be used?

\

|  |  |
| --- | --- |
| A | chemical spills |
| B | fire |
| C | acid burn |

\_A\_\_\_ 5. During an experiment, Lindsey decides to mix two chemicals that the lab procedure does not say to mix, because she is curious about what will happen. Which safety rule is being broken?

|  |  |
| --- | --- |
| A | Never perform activities that are not assigned or authorized by your teacher. |
| B | To protect yourself from injuring your eyes, wear safety goggles whenever you work with chemicals. |
| C | Wear a lab apron or coat whenever you work with corrosive chemicals. |

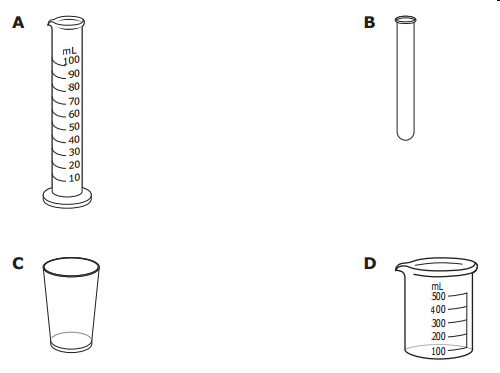
\_B\_\_\_ 6. The safety equipment locations for the 7th and 8th grade science class are

|  |  |
| --- | --- |
| A | Under the TV and next to the pencil sharpener |
| B | In the bottom cabinet under the flag and behind the big window wall |

**PROCESS STANDARD 8.1: OBSERVE AND MEASURE (SCIENCE METRICS)**

\_A\_\_\_ 7. Which piece of equipment would accurately measure 50 milliliters of

liquid?



|  |  |
| --- | --- |
| A | A |
| B | B |
| C | C |
| D | D |

\_C\_\_\_ 8. Use the thermometers to answer the question:



What was the increase in temperature from Tuesday to Wednesday?

|  |  |
| --- | --- |
| A | 32 degrees C |
| B | 21 degrees C |
| C | 11 degrees C |

\_B\_\_\_ 9. The metric system of measurement is based on the number

|  |  |
| --- | --- |
| A | 1. |
| B | 10. |
| C | 12. |

\_B\_\_\_ 10. The basic unit of length in the metric system is the

|  |  |
| --- | --- |
| A | foot. |
| B | meter. |
| C | mile. |

\_C\_\_\_ 11. Use the metric ruler and line to answer questions 11 and 12.



What is the length of the line in centimeters?

|  |  |
| --- | --- |
| A | 28 cm |
| B | 3 cm |
| C | 2.8 cm |

\_A\_\_\_ 12. What is the length of the line in millimeters?

|  |  |
| --- | --- |
| A | 28 mm |
| B | 30 mm |
| C | 2.8 mm |

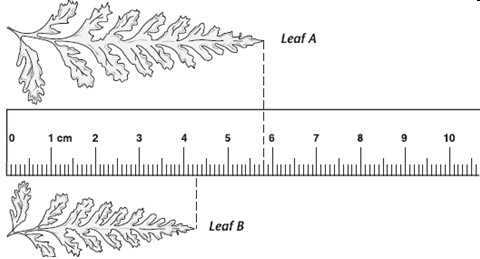
\_C\_\_\_ 13. The amount of matter (stuff) in an object is its

|  |  |
| --- | --- |
| A | volume |
| B | density |
| C | mass |

\_A\_\_\_ 14. The amount of space an object takes up is its

|  |  |
| --- | --- |
| A | volume. |
| B | density. |
| C | mass. |

\_B\_\_\_ 15. Use the diagram below to answer the question:



How many centimeters longer is Leaf A than Leaf *B?*

|  |  |
| --- | --- |
| A | 4.3 cm |
| B | 1.5 cm |
| C | 1.4 cm |

\_\_C\_\_ 16. If a shoe box measures 6 cm high, 7 cm wide, and 20 cm long, what is its volume?

|  |  |
| --- | --- |
| A | 840 cm |
| B | 420 cm3 |
| C | 840 cm3 |

\_\_B\_\_ 17. *Use the diagrams to answer the question.*



What is the volume of the rock?

|  |  |
| --- | --- |
| A | 75 mL |
| B | 25 mL |
| C | 75 cm |

\_B\_\_\_ 18. The gram is the basic metric unit of

|  |  |
| --- | --- |
| A | volume. |
| B | mass. |
| C | weight. |

\_\_B\_\_ 19. Mass and weight are different because

|  |  |
| --- | --- |
| A | mass depends on the force of gravity, weight does not. |
| B | weight depends on the force of gravity, mass does not. |
| C | weight depends on the amount of matter an object contains. |
| D | mass does not depend on the amount of matter an object contains. |

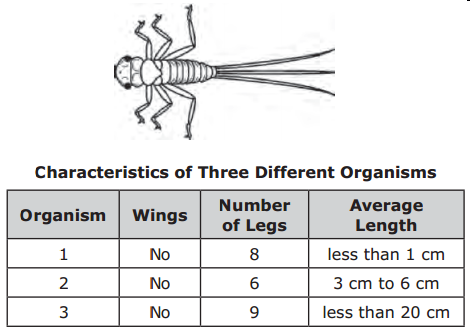
\_\_A\_\_ 20. Sade wants to measure the volume of the liquid in the Petri dish.



Which unit of measurement should she use?

|  |  |
| --- | --- |
| A | milliliters |
| B | milligrams |
| C | milliseconds |

\_\_B\_\_ 21. The student collected an organism. She measured its length to be 4.5 centimeters (cm). She drew the following picture of the organism.



Which organism did the student collect?

|  |  |
| --- | --- |
| A | organism 1 |
| B | organism 2 |
| C | organism 3 |

**PROCESS STANDARD 8.3: EXPERIMENTAL DESIGN**

\_C\_\_\_ 22. Theodore learns from what he sees or experiences directly. He learns from:

|  |  |
| --- | --- |
| A | inference |
| B | bias |
| C | observation |

\_\_B\_\_ 23. Observations that deal with a number or amount are called

|  |  |
| --- | --- |
| A | manipulated observations. |
| B | quantitative observations. |
| C | qualitative observations. |

\_\_C\_\_ 24. Observations that deal with descriptions that cannot be expressed in numbers but are described by using the 5 senses are called

|  |  |
| --- | --- |
| A | manipulated observations. |
| B | quantitative observations. |
| C | qualitative observations. |

\_\_B\_\_ 25. Explaining or interpreting the things you observe based on reasoning from what you already know is called

|  |  |
| --- | --- |
| A | observing. |
| B | inferring. |
| C | predicting. |

\_\_B\_\_ 26. If you explain the changing colors of the sky with an educated guess or testable prediction, you are proposing a(n)

|  |  |
| --- | --- |
| B | law of nature |
| B | hypothesis |
| C | weather report |

\_A\_\_\_ 27. During an experiment, if you purposely change the temperature to test a hypothesis, the temperature is called the

|  |  |
| --- | --- |
| A | independent (manipulated) variable. |
| B | dependent (responding) variable. |
| C | operational variable. |

\_B\_\_\_ 28. In a scientific experiement, the factor that may change in response to the independent (manipulated) variable is called the

|  |  |
| --- | --- |
| A | hypothetical variable. |
| B | dependent (responding) variable. |
| C | operational variable. |

\_\_A\_\_ 29. A student wanted to see if two brands of carbonated drink contained the same amount of dissolved gas. She performed the following steps in her experiment.

A. Recorded the price of each bottle of soda

B. Opened soda bottles and put empty balloons over the bottle mouths

C. Set bottles in a sunny place for 2 hours

D. Compared the size of the full balloons

Which step would not help her find out if the hypothesis is correct?

|  |  |
| --- | --- |
| A | A |
| B | B |
| C | C |
| D | D |

\_C\_\_\_ 30. A summary of what you have learned from a scientific experiment is called a(n)

|  |  |
| --- | --- |
| A | hypothesis. |
| B | inquiry. |
| C | conclusion. |

\_\_C\_\_ 31. A student wanted to know if steel wool reacts with air and water.

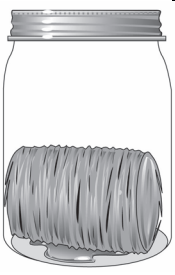
The student did the activity by performing these steps:

1. Placed the steel wool in a clear jar and screwed on the cap

2. Let the jar stand for one full day

3. Recorded the observations

4. Wet the steel wool in some water



In which order should the student have completed the steps listed above?

|  |  |
| --- | --- |
| A | 2, 3, 4, 1 |
| B | 4, 2, 3, 1 |
| C | 4, 1, 2, 3 |

**Matching**

Match the following vocabulary words with problems **38-42**

|  |  |  |  |
| --- | --- | --- | --- |
| A | Independent Variable | D | Qualitative Observation |
| B | Dependent Variable | E | Data |
| C | Controlling Variables |

\_B\_\_\_ 32. What you measure or observe to obtain your results, influenced by the independent variable

\_E\_\_\_ 33. Measurements and other observations

\_A\_\_\_ 34. Factor that is changed in an experiment

\_D\_\_\_ 35. What the person performing the activity sees, hears, feels, smells, or tastes

\_C\_\_\_ 36. Keeping all variables the same except the Independent (manipulated) variable